



**UNITED STATES DEPARTMENT OF COMMERCE
Patent and Trademark Office**

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

CH

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. |
|-----------------|-------------|----------------------|---------------------|
| 08/889,440 | 07/08/97 | TAKEUCHI | M 21.1837/PIK |

STAAS AND HALSEY
SUITE 500
700 ELEVENTH STREET NW
WASHINGTON DC 20001

LM02/0618

EXAMINER
JONES, H

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| 2763 | 9 |

DATE MAILED: 06/18/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.
08/889,440

Applicant(s)
Takeuchi et al.

Examiner
Hugh Jones

Group Art Unit
2763



☒ Responsive to communication(s) filed on Feb 9, 1999

☒ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-32 is/are pending in the application.

Of the above, claim(s) _____ is/are withdrawn from consideration.

☒ Claim(s) 1-19 and 23-32 is/are allowed.

☒ Claim(s) 20-22 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

Art Unit: 2763

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. Claims 20-22 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The applicant is attempting to claim an algorithm, specifically a simulation algorithm. It is not clear what constitutes the end use of the invention, as per claims 20-22. As per remarks (pg. 6 of paper # 8) concerning tangible results; what is the useful result of simulating phenomena of a combined particle? These claims represent abstract ideas without any useful application. Clearly, the specification is directed towards sputtering - however, this is not evident in claims 20-22.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 20-22 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Art Unit: 2763

Allowable Subject Matter

4. Claims 1-32 are allowable over the prior art.

5. The following is an examiner's statement of reasons for allowance (assuming the 101 problem is addressed): The comments on page 9 regarding the applicant's definition of "combined particle(s)" is important. In paragraph 4, it is stated, "First, a combined particle is formed of both substrate particles and adsorbate particles, not simply adsorbate particles as advocated by the Examiner. The combination of a substrate particle and an adsorbate particle to form a combined particle does not mean that the particles are interacting with one another. Rather, this is meant as a fictitious representation and is not intended as a physical criterion." Baumann et al. disclosed the simulation of clusters wherein the clusters were composed of interacting particles (via dipole-dipole or other interparticle forces). Since the particles in applicant's disclosure are not interacting, the art rejection based on Baumann et al. is not applicable. Similarly, there are inter-particle interactions in the disclosure of Misaka et al., and thus, this also is not an applicable citation. The concept of fictitious particles has been disclosed previously (as noted by examiner in the last action - quasi-particles, effective mass electrons in periodic potentials, polarons, etc.), but the concept has apparently not been applied to combinations of substrate and adsorbate particles as per sputtering simulations. Since said "combined particle(s)" is present in each of the independent claims, all claims are allowable over the prior art.

Art Unit: 2763

Response to Arguments

6. Applicant's arguments filed 2/9/99 have been fully considered but they are not persuasive with respect to the 101 rejection. As per the 101 rejection (paper # 6), it is still not clear what constitutes the end use of the invention, as per claims 20-22. As per remarks (pg. 6 of paper # 8) concerning tangible results; what is the useful result of simulating phenomena of a combined particle? These claims are directed abstract ideas without any useful application. Clearly, the specification is directed towards sputtering - however, this is not evident in claims 20-22. As per remarks concerning the 112 (first) rejection (page 7 of paper # 6), since the claimed invention is not supported by either a asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

7. As per limitations concerning user interfaces (such as kinetic "condition setting unit" and spatial representations of the simulation ["display"]; see claim 17, for example), and in response to applicant's comments ("smoke and mirrors", page 11, applicant's response), examiner respectfully maintains that these limitations have been disclosed in the prior art. In response to applicant's request for prior art concerning user interfaces, the following is provided:

a) Cornell Theory Center (1996) discloses an animated simulation of the dynamic failure of 3D solids under tension at the atomistic level using classical molecular dynamics and system sizes from 10 to more than 100 million atom.

Art Unit: 2763

b) XSIMBAD (1996) discloses a Monte Carlo simulation software package. A condition setting user template is shown on pp 3-4; animated simulation results are shown on pp. 5 and 11-12, graphical results are shown on pg. 6 and 11.

8. These references are a few examples of many references which the examiner has obtained concerning animation as applied to simulation in general, and sputtering, in particular.

However, since these are claims are dependent on allowable claims, they are also allowable.

9. A number of points need to be noted. As per comments (pg. 8 of applicant's response) regarding paragraph 10 of examiner's action, the examiner questioned how a substrate particle can include a free particle since by definition a substrate particle is tied to the lattice. In response, applicant stated (pg. 8), "As explained above, a substrate particle can form both a crystal structure and an amorphous structure..." Examiner would respectfully suggest that a collection of substrate particles can form said lattices. Furthermore, applicant states, "...Their equilibrium positions are decided by the equilibrium structure, and they vibrate around the position via their kinetic energies and interactions with surrounding particles." The examiner agrees with that characterization. Applicant then concludes, "Thus, the substrate particle is not tied to the lattice..." The examiner respectfully, but strongly, disagrees with said conclusion. By applicant's own admission (ie., the preceeding), the substrate particles are in equilibrium positions - they are dynamically tied to the lattice (regular or amorphous) via intermolecular forces - in other words, they are not free particles, as per the commonly accepted meaning of a free particle. Applicant has the option to define terms - so long as the record is clear as to the intended meaning of said word.

Art Unit: 2763

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

11. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Hugh Jones whose telephone number is (703) 305-0023.

Dr. Hugh Jones

June 9, 1999


ERIC W. STAMBER
PRIMARY EXAMINER